

**REPORT DOCUMENTATION PAGE****Form Approved**  
**OMB No. 0704-0188**

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503.

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<b>1. REPORT DATE (DD-MM-YYYY)</b> 10-08-2009		<b>2. REPORT TYPE</b> Master of Military Studies Research Paper		<b>3. DATES COVERED (From - To)</b> September 2009 - April 2010	
<b>4. TITLE AND SUBTITLE</b> Operation EAGLE CLAW: Pioneer of Modern Aviation Tactics, Techniques and Procedures				<b>5a. CONTRACT NUMBER</b> N/A	
				<b>5b. GRANT NUMBER</b> N/A	
				<b>5c. PROGRAM ELEMENT NUMBER</b> N/A	
<b>6. AUTHOR(S)</b> Major Isaac G. Lee				<b>5d. PROJECT NUMBER</b> N/A	
				<b>5e. TASK NUMBER</b> N/A	
				<b>5f. WORK UNIT NUMBER</b> N/A	
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> USMC Command and Staff College Marine Corps University 2076 South Street Quantico, VA 22134-5068				<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b> N/A	
<b>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> N/A				<b>10. SPONSOR/MONITOR'S ACRONYM(S)</b> N/A	
				<b>11. SPONSORING/MONITORING AGENCY REPORT NUMBER</b> N/A	
<b>12. DISTRIBUTION AVAILABILITY STATEMENT</b> Unlimited					
<b>13. SUPPLEMENTARY NOTES</b> N/A					
<b>14. ABSTRACT</b> The tactics, techniques and procedures that were developed out of necessity to train Operation EAGLE CLAW aircrews for Night Vision Goggle flying and Rapid Ground Refueling, accelerated the advancement of aviation tactics and became the basis of today's tactics, techniques and procedures.					
<b>15. SUBJECT TERMS</b> Operation EAGLE CLAW, Aviation Tactics, RH-53D, CH-53D, MC-130, EC-130					
<b>16. SECURITY CLASSIFICATION OF:</b>			<b>17. LIMITATION OF ABSTRACT</b> UU	<b>18. NUMBER OF PAGES</b> 47	<b>19a. NAME OF RESPONSIBLE PERSON</b> Marine Corps University / Command and Staff College
<b>a. REPORT</b> Unclass	<b>b. ABSTRACT</b> Unclass	<b>c. THIS PAGE</b> Unclass			<b>19b. TELEPHONE NUMBER (Include area code)</b> (703) 784-3330 (Admin Office)

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MASTER OF MILITARY STUDIES

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**TITLE:**

**Operation EAGLE CLAW: Pioneer of Modern Aviation Tactics, Techniques and Procedures**

SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF MILITARY STUDIES

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AY 09-10


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Date: 17 MARCH 2010

## **Executive Summary**

**Title: Operation EAGLE CLAW:** Pioneer of modern aviation tactics, techniques and procedures.

**Author:** Major Isaac Lee, United States Marine Corps

**Thesis:** The tactics, techniques and procedures that were developed out of necessity to train Operation EAGLE CLAW aircrews for Night Vision Goggle flying and Rapid Ground Refueling, accelerated the advancement of aviation tactics and became the basis of today's tactics, techniques and procedures.

**Discussion:** On 4 November 1979, armed militants stormed the American Embassy in Tehran, Iran taking 66 American hostages. Two days later an ad hoc planning cell from within the Joint Staff's J-3 Special Operations Division was formed to plan a clandestine military rescue option. The planning group was dubbed "Rice Bowl" and went to work immediately despite no one on the American side expecting the military rescue would actually be necessary. Operation EAGLE CLAW was born.

The mission would require an aerial insertion and extraction of Delta Force in order to rescue the hostages. Navy RH-53D helicopters and Air Force MC-130 aircraft were selected to execute the mission and crews were quickly chosen to begin training for execution. The mission would require all of the aircrew to be proficient on flying under the cover of darkness utilizing Night Vision Goggles (NVGs). Both groups started at "ground zero" and quickly developed the NVG tactics, techniques and procedures (TTPs) that were utilized to train the crews and execute the mission. In addition the crews collaborated on the development of TTPs to facilitate the refueling of the RH-53Ds on deck from a portable fuel system within the MC-130s. The crews trained for more than five months prior to receiving an execution order in April of 1980. Operation EAGLE CLAW came to a tragic ending in the Iranian Desert on 24 April 1980, when one of the RH-53D helicopters collided with an EC-130 at a remote refueling site in the Iranian Desert named "Desert One."

**Conclusion:** In the 30 years since Operation EAGLE CLAW, the operation has become one of the most widely scrutinized missions in the history of the United States Military. What has been lost in that scrutiny is acknowledging that the TTPs that were developed in the five months of training leading up to Operation EAGLE CLAW were the genesis of several modern aviation tactics, techniques and procedures.

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## *Preface*

As a Marine Corps CH-53 pilot, I have long been fascinated by Operation EAGLE CLAW. A long range amphibious raid into hostile enemy territory with a robust package of joint assets is the ultimate CH-53 mission and I appreciate the courage, dedication and tactical acumen exhibited by those who were part of the operation. Operation EAGLE CLAW is one of the more heavily critiqued missions in American Military history. For thirty years those who participated in the operation have graciously answered questions and passed on lessons learned in the face of heavy criticism from many people that will never face such a challenge. For over five months the Operation EAGLE CLAW aircrew trained to execute a very difficult mission, and this project is an exploration into the lasting contribution to aviation tactics that resulted.

I have several people to thank for their assistance with this project. I would like to thank Gray Research Center Librarian Rachel Kingcade for all of her assistance and Dr. Paul D. Gelpi for his continued mentorship throughout the process. I would also like to thank my wife Kerry and our children for their continued support of an absentee husband and father. Most importantly, I would like to thank all of the service members involved in Operation EAGLE CLAW. Their selfless devotion to duty and service to our country are forever appreciated. Specifically I would like to thank Colonel James Schaefer USMC (Ret), Colonel Jerry Uttaro USAF (Ret), Colonel James Kyle USAF (Ret) and Colonel Edward Seiffert USMC (Ret) for their assistance with this project. Their patience and gracious entertaining of my questions made this project possible.

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## Acronyms

AAR	Air to Air Refueling
AFTTP	Air Force Tactics Techniques and Procedures
ANTTP	Air Naval Tactics Techniques and Procedures
AGL	Above Ground Level
ASTACSOP	Assault Support Tactical Standard Operating Procedures
CIA	Central Intelligence Agency
EMCON	Emission Control
FARP	Forward Arming and Refueling Point
GPS	Global Positioning System
IMC	Instrument Meteorological Conditions
JTF	Joint Task Force
LZ	Landing Zone
MAWTS-1	Marine Aviation Weapons and Tactics Squadron One
NATO	North Atlantic Treaty Organization
NSC	National Security Council
NTTP	Naval Tactics Techniques and Procedures
NSI	Night Systems Instructor
NVGs	Night Vision Goggles
OPSEC	Operational Security
OPSO	Operations Officer
RGR	Rapid Ground Refueling
SCC	Special Coordinating Committee
SOS	Special Operations Squadron
T&R	Training and Readiness
TTPs	Tactics, Techniques and Procedures
USA	United States Army
USAF	United States Air Force
USMC	United States Marine Corps
USN	United States Navy
VMC	Visual Meteorological Conditions
WTI	Weapons and Tactics Instructor Course
YPG	Yuma Proving Grounds

## **Introduction**

On 4 November 1979 armed militants stormed the American Embassy in Tehran, Iran, taking sixty-six Americans hostage. Ten days later Colonel Charles Pitman summoned Major Jim Schaefer to the Marine Corps Air Station Yuma Bachelor Officers' Quarters for a meeting. Night Vision Goggle (NVG) flying was new to the Marine Corps and as the Rotary Wing Department Head at Marine Aviation Weapons and Tactics Squadron One (MAWTS-1), Maj Schaefer was in charge of "figuring out how to fly with them."<sup>1</sup> Pitman had traveled from the Pentagon to ask Schaefer to train seven RH-53D helicopter crews to fly with NVGs in order to execute a rescue mission.<sup>2</sup> Only three of the initial fourteen pilots selected for the operation had any NVG flying experience. The training would have to "start at ground zero" and time was of the essence.<sup>3</sup>

The mission was officially named Operation EAGLE CLAW and it was planned in secret by an ad hoc cell in the Joint Staff's Special Operations Division operating under the code name "Rice Bowl."<sup>4</sup> The rescue force was comprised of elements from every branch of the United States military. None of the individuals involved could have fathomed the degree to which the mission that they were about to embark on would later be scrutinized or the significant impact that it would have on aviation tactics for years to come. The tactics, techniques and procedures that were developed out of necessity to train Operation EAGLE CLAW aircrews for Night Vision Goggle flying and Rapid Ground Refueling<sup>5</sup> accelerated the advancement of aviation tactics and became the basis of today's tactics, techniques and procedures.

## **Background**

The United States had become the focus of Iranian angst as a result of its relationship with ousted Shah Mohammed Reza Pahlavi. The Shah had policed the Persian Gulf and created



a modern industrialized state backed with American arms, technology and advisers. Despite their progress, many Iranians detested the departure from their traditional ways resulting in unrest.<sup>6</sup> The Shah began to lose control in late 1978, relinquished his throne in the 1979 Iranian Revolution and fled to Egypt. Ayatollah Ruhollah Khomeini returned from a fourteen year exile and claimed control with his Islamist Revolutionary Party. Khomeini demanded the Shah's head and money but Egyptian leader Anwar Sadat ignored Khomeini's demands.<sup>7</sup> Multiple instances of random violence and anti-American demonstrations followed, to include a brief hostage takeover at the embassy on 14 February 1979 but Khomeini personally intervened and the government quickly restored order.<sup>8</sup>

The anti-American sentiment was rekindled seven months later when President Carter allowed the Shah admission to the United States for cancer treatment on 22 October 1979. The Tehran police controlled a 3,500 strong rally on 1 November 1979 but three days later armed militants again stormed the American embassy taking sixty-six American hostages. The militants demanded the Shah and his stolen fortune be returned in exchange for the hostages. It was apparent this seizure had Khomeini's endorsement since the government did nothing.<sup>9</sup>

President Carter's Special Coordinating Committee (SCC) met immediately following the takeover and identified seven potential options to recover the hostages. Few on the American side expected the affair to last very long and, as a result, the military rescue option was seventh on the list.<sup>10</sup> The National Security Council (NSC) met with the SCC on 6 November 1979 during which President Carter ordered the preparation of the military rescue plan.<sup>11</sup> As the Rice Bowl planners were in the initial stages of standing up a Joint Task Force (JTF) to execute the rescue plan the United States launched an unprecedented campaign of pressure against Iran that immediately garnered world support. It would ultimately have no

effect on Iran which rapidly degraded into a “renegade nation in a state of revolutionary euphoria.”<sup>12</sup>

The Rice Bowl planners had fifty-three hostages needing rescue from two separate locations.<sup>13</sup> Three others to include *Charge d’Affaires* Bruce Laingen were located a few blocks south of the embassy at the Foreign Ministry building.<sup>14</sup> The planners faced continually changing circumstances throughout a planning process that would last from 6 November 1979 through 23 April 1980. As the Holloway Commission would conclude later the “remoteness of Tehran from available bases and the hostile nature of the country further complicated the development of a feasible operational concept.”<sup>15</sup>

The initial operational concept required a clandestine land infiltration bracketed by an aerial insertion and extraction under the cover of darkness.<sup>16</sup> Delta Force was chosen as the ground force after completing their initial validation on 4 November 1979. The planners also determined that Delta would be augmented with Central Intelligence Agency (CIA) truck drivers and monitors that spoke Farsi, and Redeye Gunners for anti air defense.<sup>17</sup> The planners selected Navy RH-53D helicopters due to their ability to carry twenty Delta Commandos in addition to auxiliary internal fuel tanks that would boost their range to 750 nautical miles.<sup>18</sup> These capabilities combined with an inherent compatibility with Navy shipping facilitated the flight launching from the Gulf of Oman. Due to the range of the operation the helicopters would still require fuel support and the planners selected Air Force MC-130 aircraft to provide it. Additional Air Force C-141s and KC-135s were selected to support the MC-130 flight and the subsequent extraction of the hostages.<sup>19</sup>

Major General James Vaught, United States Army (USA), was appointed the JTF Commander. Delta Force Commander Colonel Charles Beckwith, USA, would lead the ground

assault. Colonel James Kyle, United States Air Force (USAF), would serve as the fixed wing operations commander and Colonel Charles Pitman, United States Marine Corps (USMC), would serve as the helicopter coordinator.<sup>20</sup> Captain Jerry Hatcher, United States Navy (USN), would assist Pitman with the Navy side of the helicopter detachment.<sup>21</sup> In order to execute the mission at night the RH-53D and MC-130 aircrew would have to incorporate the emerging technology of NVGs. The crews would also have to determine the best method for the MC-130's to refuel the RH-53D's en route to Tehran.

Operational Security (OPSEC) presented a major challenge from the start. Kyle and the other commanders wanted to isolate the JTF to train and identified a suitable site only to be told that "national security priorities" would preclude the use of that location.<sup>22</sup> As a result, the various components trained in separate locations where they had to cram mission training into their normal routine to keep anyone from becoming suspicious. Only a select few individuals in supervisory roles at each base were briefed on the training, which was challenging particularly for the Air Force units. Only the helicopter detachment and Delta Force would be able to ultimately maintain any semblance of isolation by relocating to the Yuma Proving Grounds (YPG).<sup>23</sup> In the initial stages there was no formal training plan. Each commander was responsible for preparing his forces for upcoming JTF rehearsals.<sup>24</sup>

Captain Hatcher tasked Commander Van Goodloe, USN, to provide all of the RH-53D helicopters from his squadron. Seven five-man RH-53D crews with a mix of Navy and Marine Corps personnel were originally selected for the mission. The Navy crews were from RH-53D squadrons and the Marine crews were coming from CH-53D squadrons. The Navy provided pilots and crew chiefs due to their familiarity with the RH-53D. The Marine Corps provided copilots due to their experience flying over land at extended ranges and operating in unprepared

Landing Zones (LZs). The Marine Corps also provided gunners to operate the two .50 caliber machine guns that would be hung in the windows of each aircraft.<sup>25</sup>

## **Ground Zero**

In 1979 Schaefer was in charge of a small group of helicopter pilots at MAWTS-1 that were in the infancy of developing the tactics, techniques and procedures (TTPs) required to train Marine Corps helicopter pilots to fly with NVGs.<sup>26</sup> Despite Schaefer's experience, serving as the "training officer" for the helicopter detachment would prove to be very challenging.<sup>27</sup> Only three of the initial fourteen pilots selected for the operation had any NVG flying experience. All three had received approximately ten hours of familiarization flights from Schaefer as students at the Weapons and Tactics Instructor (WTI) course at MAWTS-1. The rest of the detachment lacked any NVG flying experience.<sup>28</sup>

Similar to the helicopter detachment, none of the MC-130 crews had any NVG experience.<sup>29</sup> At the same time that Major Schaefer was visited by Colonel Pitman; Lieutenant Colonel Bob Brenci, USAF the 8th Special Operations Squadron (SOS) Operations Officer (OPSO), was notified by Washington that he would need to put together two MC-130 crews to take off and land blacked out on unlit runways. Brenci hung up the phone and summoned the 8th SOS Standardization Officer Captain Jerry Uttaro, to his office. His instructions were to walk over to the 20th SOS and get all of their NVGs. The 20th SOS was a helicopter squadron that had twelve sets of prototype NVGs that they were just beginning to try and fly with.<sup>30</sup> When Uttaro walked over to pick up the NVGs from the 20th SOS he had never actually seen any NVGs before.<sup>31</sup>

On 28 November 1979 six RH-53D aircraft were slipped onto the deck of the USS *Kitty Hawk* as it passed near Diego Garcia. Commander Van Goodloe sent his Executive Officer to be

in charge of the six aircraft detachment that had no idea what their mission was.<sup>32</sup> Goodloe took his remaining eight aircraft to YPG where Major Schaefer stood by with the Marine aircrew to begin training. The move to YPG was complete on 30 November 1979 and it had been accomplished without detection.<sup>33</sup>

Brenci and Uttaro immediately went to work figuring out how to fly with NVGs. When Uttaro returned with the prototype NVGs, the 20th SOS Commanding Officer Lieutenant Colonel George Borenski, USAF, came over and taught them the basics of how to turn them on and off and how to focus them.<sup>34</sup> Brenci tasked Uttaro with identifying two crews for the mission. Just two months prior, a test pilot had presented a lecture at the annual MC-130 Combat Talon Conference and stated that there was no possibility that a pilot could land or take off in a C-130 using NVGs. Only hours removed from initial notification, Uttaro and the 8th SOS crews decided to try and do it that night.<sup>35</sup>

### **Tactical Development and Training**

The next challenge for the 8th SOS MC-130 crews came with the realization that their cockpit lights were not NVG compatible. The glare from the lights inside the cockpit made it extremely difficult for the crews to see outside the aircraft. The crews had to determine which lights they could safely cover with “100 mile per hour tape” as a result.<sup>36</sup> The standard MC-130 flight deck required a pilot, copilot, engineer and two navigators. For Operation EAGLE CLAW the 8th SOS decided to add an additional safety pilot to the crew who would monitor instruments and ensure that all checklist items were complied with. The initial focus was on blacked out NVG landings, identified as the most critical phase of flight. The crews began to develop TTPs from a series of “trial and error” flights followed by extensive debriefs.<sup>37</sup>

Kyle's only guidance to Brenci was that he "wanted all crews standardized and using the same procedures and techniques...not each left to their own devices."<sup>38</sup> With those marching orders, the MC-130 crews came to a consensus on how they would divide responsibilities in the cockpit after four nights of flying. Due to limited numbers of NVGs only the pilot, copilot and engineer wore them during the landing phase. The pilot flew the aircraft to touchdown with his focus outside the aircraft.<sup>39</sup> The copilot maintained responsibility inside the aircraft and monitored the instruments so as to continuously call out altitude, airspeed and glide slope information. After approximately ten days of flying, the crews also concluded that they needed some indication of where the LZ was to ensure they landed on the correct spot with the correct heading. They concluded that a box pattern of lights in the touchdown zone and a single light at the end of the LZ would facilitate what they needed. By utilizing these TTPs the MC-130 crews were able to execute blacked out NVG landings.<sup>40</sup>

Schaefer immediately went to work training the RH-53D pilots upon their arrival at YPG. Initially, Schaefer assisted Commander Goodloe in training the combined Navy and Marine crews.<sup>41</sup> Schaefer was not a mission crew member so during the initial phases of training, he did not fly but provided instruction from the jumpseat. This would prove to be a difficult situation.<sup>42</sup> Goodloe was the Commanding Officer of the squadron that owned the aircraft as well as a mission pilot, but Schaefer was in charge of training the detachment. Schaefer had spent the last several months attempting to develop an effective way to train Marine Corps pilots to fly with NVGs and the RH-53D crews for Operation EAGLE CLAW became his test bed. Since he was starting from scratch with these crews and the timeline was unknown, Schaefer needed their full cooperation in executing the training syllabus he had created for them but Goodloe was resistant.<sup>43</sup>

Three years prior, Schaefer flew with USAF H-53 pilots as well as H-53 pilots in Israel and Germany to capture helicopter tactics for incorporation into the Marine Corps. Until that time the Marine Corps lived off of “Vietnam tactics consisting of externals and getting shot at.”<sup>44</sup> Schaefer then visited Fort Rucker, Alabama where he and a few other soon to be MAWTS-1 instructors flew about eight hours of NVG familiarization in an Army UH-1 over the course of a week. Maj Schaefer took ten sets of NVGs back to MAWTS-1 from Fort Rucker and started the process of flying with them and capturing lessons learned.<sup>45</sup> Schaefer had begun some familiarization flights with students attending the WTI course at MAWTS-1 but there was still no formal syllabus in place.<sup>46</sup>

The helicopter detachment training focused on navigation, formation flying, and night landings under “blackout conditions.”<sup>47</sup> The biggest issue was landing in the desert where the helicopters often encountered brownout conditions.<sup>48</sup> Colonel Beckwith moved Delta Force out to YPG so that they could work with the helicopter detachment and he was critical of the helicopter detachment from the start. Beckwith “preferred pilots with a ‘barnstorming’ attitude who weren’t afraid to stick their necks out to get the job done.”<sup>49</sup> Several factors contributed to a rough start in training the helicopter detachment. Major Schaefer had a planned syllabus for the crews but had difficulty getting Commander Goodloe to follow it. Goodloe would often take off and “go fly around” instead of executing the plan for the night.<sup>50</sup> The Navy pilots also expressed their concerns about the training to Captain Hatcher. They were very uncomfortable that there were no written procedures for what they were doing and that they were developing TTPs that were not in any manual.<sup>51</sup> This was the case for all the aircrew training for the mission. The lack of cooperation from the Navy pilots was an unneeded detractor to an already compressed timeline.

The situation came to a head during the first integrated training between the RH-53D and MC-130 crews on 4 December 1979. The mission required that the helicopters be refueled at some point prior to reaching Tehran from the Gulf of Oman. The original plan was to air drop fuel blivets from the MC-130s that could quickly be organized into a Forward Arming and Refueling Point (FARP) for the RH-53Ds. On the first night of integrated training two MC-130s dropped ten of the 500 gallon fuel blivets. Only three blivets survived the drop while the rest “Roman-candled into the drop zone like overripe watermelons falling off of a garbage truck.”<sup>52</sup> It was a complete failure. In addition to the fuel blivet disaster the helicopter crews continued to struggle with night navigation and took forty-five minutes to execute a single landing of all the helicopters.<sup>53</sup> Changes had to be made.

That night Schaefer recommended to Colonel Pitman that some of the mission pilots be replaced. Delta Force was also getting skittish about how the helicopter pilots were progressing and as a result Major General Vaught ordered the pilots replaced.<sup>54</sup> Colonel Ed Seiffert, USMC replaced Goodloe as the flight leader and eight other pilots were replaced also. Seiffert was a Vietnam Veteran with “beaucoup” helicopter flying experience.<sup>55</sup> He and the other replacement pilots selected came with the personal recommendation of Maj Schaefer. At this time Schaefer went from being an advisor to being a crew member and the OPSO for the detachment.<sup>56</sup> One week after initial training, the new crews were on deck and they started over again from scratch.<sup>57</sup> The first night he arrived in Yuma, Colonel Seiffert and Major Schaefer discussed the details of the training plan that Schaefer had put together for the crews. Together they made adjustments and wrote a ten flight syllabus that they could execute to “baseline all of the crews.”<sup>58</sup>



As a result of the fuel blivet disaster Major General Vaught also decided that the mission would require the use of the brand new C-130 bulk fuel delivery system and ordered intelligence to find an airfield in Iran where they could land to refuel the helicopters.<sup>59</sup> The system was so new that the crews themselves would have to develop the TTPs for using it. This meant, the MC-130s were definitely going to have to execute a blacked out landing at night in the desert.<sup>60</sup>

The MC-130 crews had all previously transported and unloaded fuel blivets for FARPs but the new bulk fuel delivery system required the MC-130s to leave mattress shaped bladders in the cargo compartment of their aircraft with hoses run out to the helicopters.<sup>61</sup> This required the development of a new type of fuel site where the helicopters had to ground taxi in very close proximity to the MC-130s that would fuel them. Since it had never been done before, the MC-130 and RH-53D crews “drew it up in the dirt.”<sup>62</sup> The initial issue was figuring out who was going to be responsible for running the refueling site. The crews determined that the MC-130s would bring fuel personnel to run the marshalling and operate the system.<sup>63</sup> With the bladders inside the MC-130s the pump would only fit on the ramp so the logical configuration for the refueling site was to run the hoses out the ramp and fuel the helicopters aft of the MC-130s.<sup>64</sup> The configuration got its first test on 18 December 1979.<sup>65</sup>

With Major Schaefer functioning as both the OPSO and a crew member he was able to execute his training plan with no issues. Two of the Marine replacement pilots had been through the WTI course where they had received some NVG familiarization flights from Schaefer, which increased slightly the total NVG experience of the detachment. For the first week the crews focused solely on executing basic landings while flying in the local pattern at YPG. Schaefer had come up with a technique for landing with NVGs in the desert under brownout conditions and the crews immediately began practicing the technique to the runway at YPG.<sup>66</sup>

Schaefer recognized that executing a NVG landing in brownout conditions would be extremely challenging for the helicopter crews. Repetition would be essential to gain proficiency. In order to provide the combined Navy and Marine crews with a familiar framework Schaefer utilized a modified shipboard landing pattern. Doing so allowed the crews to fly a pattern of familiar altitude and airspeed checkpoints to their final approach to allow them to concentrate on the landing. Executing this pattern ensured that the crews set themselves up at a well controlled altitude, airspeed, and glide slope as they entered the dust cloud on their final approach. As the crews proceeded through ten feet Schaefer taught the crews to continue forward and down to execute a no hover landing instead of coming into a stable hover as they would on a ship. By not pausing in a hover and maintaining approximately 5 knots of airspeed on the aircraft to touch down the crews were more effectively able to push through the dust.<sup>67</sup>

From the local pattern the helicopter crews began working on low level navigation routes in the Yuma Range Complex surrounding YPG. Schaefer mapped out routes and had support from a single UH-1N helicopter that would go out and place beacons at predetermined points. The crews started with 100 nautical mile routes while also working on desert landings. Schaefer constantly moved the crews around in an effort to identify the pilots with the best NVG flight and navigation skills. The goal was to ensure that each cockpit would have eight balanced crews when it came time to execute. Schaefer believed “they would only be as strong as their weakest link.”<sup>68</sup>

The MC-130 crews also continued to develop and refine their tactics. The development of the ground refueling site and the ability to takeoff and land in blacked out conditions were paramount but two other issues required attention. The MC-130s had previously flown in a trail formation during both day and night flying operations. The crews discovered that depth

perception was much harder to determine on NVGs so the crews adopted the procedure of spreading out to a fingertip formation at night to avoid rapid closure rates developing in trail. The MC-130 crews also needed to aerial refuel from Air Force KC-135s en route to Desert One. While this was common practice for the MC-130 crews, it was something they had never done while on NVGs or without positive communications with the Air Force tankers. Due to their previous experience, the crews were able to rapidly develop the capability to execute the procedure on NVGs under emission control (EMCON) conditions.<sup>69</sup>

On 18 December 1979 another integrated training exercise was conducted with the new helicopter pilots. More importantly, it would be the first test run for the MC-130 bulk fuel delivery system and a third MC-130 had been added to support the requirement. In the first attempt, the crews discovered that the marshalling procedures at the fuel site needed work and that their hoses needed to be longer to provide more clearance between the helicopters and the MC-130s.<sup>70</sup> There was some concern from the MC-130 crews about lengthening the hoses because the longer the hoses got, the longer they would take to purge after refuel operations were complete. Despite their concern, the hoses would be doubled in length prior to execution.<sup>71</sup>

On 22 December 1979 two additional RH-53D helicopters were airlifted and embarked aboard USS *Nimitz* for transit to the Indian Ocean.<sup>72</sup> The six RH-53D helicopters already aboard the USS *Kitty Hawk* were also cross decked to the USS *Nimitz*.<sup>73</sup> Omega navigation systems<sup>74</sup> had also been acquired and were being installed on all eight of the aircraft now aboard the USS *Nimitz*, as well as the ten helicopters being used for training back at YPG.<sup>75</sup>

### **Final Operational Concept**

The Rice Bowl planners finalized the operational concept at the end of December. The plan called for Operation EAGLE CLAW to be executed in three phases over the course of two

nights. In Phase One, the CIA and a Delta advance team would infiltrate Iran to procure trucks and establish forward staging bases. In Phase Two, the MC-130s and RH-53Ds would fly into Iran and meet on deck to cross load Delta Force and refuel the helicopters. The helicopters would then insert Delta Force near the vehicles and proceed to a hide site prior to sunrise on day two. Phase Three would take place on the second night. Delta Force would move to the embassy compound to recover the hostages while three MC-130s and two C-141s would secure Manzariyeh airstrip. The helicopters would then depart their hide site and extract Delta Force and the hostages from the stadium across the street from the embassy compound for transport to Manzariyeh, where everyone would destroy the helicopters in place and depart in the waiting MC-130s and C-141s.<sup>76</sup>

Training temporarily ceased on 22 December 1979 to allow the members of the JTF to return home for the Christmas holiday.<sup>77</sup> During the break, Colonel Kyle traveled back to the Pentagon where he argued that some of the replacement helicopter pilots should come from the Air Force. Despite his pleas, the decision remained that they would be Marines.<sup>78</sup>

On 5 January 1980 the helicopters resumed training at YPG utilizing the Omega navigation systems. It was determined that the weather forecast would have to be for Visual Meteorological Conditions<sup>79</sup> on the entire route for the helicopters to take off. Weather support was a known crucial factor and the search for additional support continued.<sup>80</sup> Due to large gaps in Iranian weather reporting the JTF would utilize what little information was available from the USAF Global Weather Center at Offutt Air Force Base, Nebraska.<sup>81</sup> Due to the personnel and equipment requirements outlined in the final operational concept the decision was made on 5 January 1980 to add a fourth MC-130 to support the required lift capability. The fourth MC-130 would arrive on 12 January 1980 to join the training.<sup>82</sup>

A third joint training exercise was conducted in mid-January highlighting several lingering problems including: OPSEC, weather reporting, helicopter reliability, communications, refueling procedures, airfield security control and intelligence. While the exercise was underway the Rice Bowl planners finalized the final details for the mission. The JTF identified an area in Iran that was sufficiently isolated for the MC-130s and helicopters to rendezvous to refuel and load Delta Force on the helicopters. The planners named the site "Desert One."<sup>83</sup>

The number of helicopters required for the mission was also finalized. Six helicopters would be required at the refueling site to support the insert into the hide site. In order to accomplish that all eight helicopters aboard the USS *Nimitz* would need to be operational to ensure a minimum initial launch of seven. On 21 January 1980 the final number of MC-130s required was also increased to six to support the fuel requirements of the helicopters. These crews were considered mission capable in two weeks.<sup>84</sup> The rapid training of the new MC-130 crews was facilitated by moving one pilot, one navigator and one loadmaster from one of the previously existing crews to each of the new aircraft, thus spread loading the previous training experience. The new crew members were also very experienced members of the 1<sup>st</sup> SOS in the Pacific theater that were able to quickly integrate with those from the 8<sup>th</sup> SOS.<sup>85</sup> While the fixed wing contingent was busy getting their new crews up to speed, Major Schaefer was in the final stages of working the helicopter crews up to 250 mile navigation routes in preparation for the much longer route they would have to fly into Iran.<sup>86</sup>

A fourth joint training exercise was conducted during the first two weeks of February with some notable progress. The JTF wanted some additional training on helicopter navigation, combat control and the refueling of the helicopters, but for the first time the commanders and planners had confidence that the capability existed to execute the rescue. Confidence was

further increased two weeks later with an even more successful fifth exercise.<sup>87</sup> The commanders and planners then became very concerned about the execution timeline. The available hours of darkness were beginning to decrease and the ambient temperatures were rising. By 1 May 1980 there would only be nine hours and sixteen minutes of complete darkness between end of evening nautical twilight and beginning morning nautical twilight. With eight hours required for the mission, and only a one hour contingency factor, there would be little room for error. By 10 May 1980 ambient temperatures would reach thirty degrees Celsius increasing the density altitude and decreasing helicopter performance. Letting the timeline slide any further to the right would result in the need for additional aircraft to provide the same lift capability.<sup>88</sup>

In late March the aircrew briefly experimented with an aerial refueling option for the helicopters. The helicopter crews took to it well but in order to make the refueling track work the MC-130s would have to find a new takeoff location.<sup>89</sup> In addition, the planners discovered that there were not enough low speed drogues available to configure enough C-130s for Helicopter Air to Air Refueling (HAAR) for the mission.<sup>90</sup> It was too late to make the adjustment and the ground refueling option would have to work.<sup>91</sup> Immediately following that decision, Major Schaefer traveled to the USS *Nimitz* to check on the helicopters. Two were “down” for parts and he felt that none of the aircraft were being flown enough. Schaefer reported his concerns back to Colonel Pitman who rectified the issue.<sup>92</sup> The final late change was to replace three of the MC-130 aircraft with EC-130s that had more cargo space. This increased cargo capacity would allow these three aircraft to carry two 3,000 gallon fuel bladders each, providing the capability to refuel ten helicopters. The pilots that had been flying the replaced MC-130s would fly the EC-130s.<sup>93</sup>

## Final Preparations

On 31 March 1980 the CIA covertly flew a Twin Otter on the planned route into Iran and executed a landing at Desert One. Remote controlled landing lights were planted for the MC-130s and soil samples were taken to ensure the composition would be able to support the weight of all the aircraft on deck. That same day two Special Forces operators infiltrated Iran to reconnoiter the embassy, the Ministry of Foreign Affairs, and truck routes into the city from the hide site.<sup>94</sup> On 7 April 1980 the JTF Commander concluded that Desert One was suitable for the refuel option.<sup>95</sup>

After six months of attempted diplomacy, economic sanctions, and appeal for help from the international community the United States cut diplomatic relations with Iran. It was time to exercise the military option.<sup>96</sup> On 12 April 1980 the JTF finalized planning for the deployment. The Commander JTF recommended 24 April 1980 for execution. As a final verification of the refueling capability, four RH-53D helicopters and one EC-130 executed one final refueling rehearsal. On 16 April 1980 the Joint Chiefs approved the plan and President Carter signed off on the mission that night with a planned execution date of 24 April 1980. The forces deployed from 19-23 April and by mid afternoon on 24 April 1980, they were ready to execute.<sup>97</sup>

The final plan remained true to the operational concept. On the first night one MC-130 would depart Masirah, Oman at dusk with the first group of ground forces to provide initial security at Desert One. Three EC-130s were to follow in trail carrying 18,000 gallons of fuel for the helicopters. Eight RH-53Ds would simultaneously launch off of the USS *Nimitz* in the Gulf of Oman. One hour later the final two MC-130s would take off with the remainder of the ground forces. All of the aircraft were set to rendezvous on deck at Desert One to refuel the helicopters and to load the ground forces onto the helicopters for insertion into the hide site. The helicopters

would then execute the insertion and proceed to their own hide site near the town of Garmsar, Iran, where they would camouflage the aircraft and set up defensive positions prior to sunrise. All six C-130s would return to Masirah, Oman aerial refueling from KC-135s en route.<sup>98</sup>

On the second night the ground force would drive to the embassy compound and the Ministry of Foreign Affairs building to rescue the hostages. Once inside the compound the ground force would call the helicopters for extraction from Amjadieh soccer stadium, which was across the street from the embassy compound. A minimum of five helicopters would be required to execute the extraction in one wave. Four MC-130s and two C-141s would simultaneously land at Manzariyeh airport on the outskirts of Tehran with a one-hundred man Ranger force to secure the airport. Four AC-130 gunships would provide overhead security for the entire operation. After extracting the hostages and the ground force from the soccer stadium, the helicopters would proceed to Manzariyeh airport where the helicopters would be destroyed in place and all mission personnel and the hostages would depart in the C-141 and MC-130 aircraft. As Colonel Kyle observed it “was a complex plan.”<sup>99</sup>

## **Execution**

In execution, the mission got off to a solid start. All of the aircraft took off on time and were en route to Desert One. As the flight of eight helicopters started on their 600 mile flight to Desert One, Major Schaefer settled in and noted that the visibility was great due to the “nice big moon.”<sup>100</sup> Two hours later the flight encountered their first problem. Helicopter number six received cockpit indications of an impending rotor blade failure and executed an emergency landing. The malfunction was verified and the crew was picked up by another helicopter.<sup>101</sup> One hour later the remaining seven helicopters crossed over the city of Bam, Iran, when Major Schaefer suddenly lost sight of the other helicopters in the flight. Schaefer quickly realized that



the flight had entered a severe dust storm that the locals referred to as a “haboob.” The flight took separation and continued towards Desert One. Throughout five months of training, encountering such Instrument Meteorological Conditions<sup>102</sup> had been briefed and rehearsed as an abort criterion. Maj Schaefer remembers, “I kept waiting for someone to call an abort, and no one ever did.”<sup>103</sup>

The C-130s encountered the same storm but were able to climb above it. They unsuccessfully tried to warn the helicopters via radio and continued to press towards Desert One. One hour later the helicopters broke out of the dust storm and successfully reconstituted their flight. Another hour passed and the helicopter flight hit a second haboob, the flight again gained separation from one another and continued to press towards Desert One. Shortly thereafter helicopter number five lost several navigation and flight instruments and made the decision to abort and return back to the USS *Nimitz*. The flight was now down to the minimum go criteria of six helicopters.<sup>104</sup> Meanwhile the C-130s had landed at Desert One and upon debarking the ground force immediately encountered a bus with 43 passengers. Immediately after stopping the bus, Delta saw a 3,000 gallon fuel truck rapidly approaching. The driver failed to comply with warnings to stop and Delta responded by firing on the truck with an anti-tank missile.<sup>105</sup> Moments later the helicopter flight broke out of the second haboob and had the burning fuel truck to guide them to Desert One.<sup>106</sup>

At Desert One the helicopters began the refueling operation as Delta Force began loading for the insertion into the hide site. Helicopter number two had been experiencing hydraulic problems in flight and once on deck they determined that they had a pump failure that would prevent them from proceeding any further. The mission had reached abort criteria.<sup>107</sup> Colonel Kyle advised Major General Vaught via radio who in turn relayed the information to

Washington. Moments later, President Carter approved the decision to abort and prepare to withdraw the remaining operational helicopters, C-130s and the rescue force after releasing the bus passengers and sanitizing the area.<sup>108</sup> Kyle began informing the crews of the plan to execute the abort. Kyle boarded Major Schaefer's aircraft and informed him that he needed to reposition in order to allow the first EC-130 to depart. Schaefer had damaged his nose wheel upon landing, severely limiting his ability to ground taxi his helicopter.<sup>109</sup> As Schaefer lifted to air taxi his aircraft he was "immediately engulfed in dust" and moments later Colonel Kyle saw the explosion as the helicopter struck the EC-130 in front of it.<sup>110</sup> The subsequent fire and explosions rendered at least one other helicopter inoperable. Eight servicemen were killed and another five injured. The decision was made to transfer all of the helicopter crews to the remaining C-130s and depart Desert One.<sup>111</sup>

### **Aftermath**

In May 1980 the Joint Chiefs of Staff commissioned a Special Operations Review Group, better known as the "Holloway Commission," to conduct an assessment of the attempted rescue operation. The Holloway Commission was comprised of six flag officers from all four services, none of whom had been associated with the mission in any way.<sup>112</sup> The Commission ultimately identified twenty-three issues, eleven of which they considered to be "major" and should be considered at all levels of planning for future special operations. The major issues included: OPSEC, independent review of plans, command and control, comprehensive readiness evaluation, size of helicopter force, overall coordination of joint training, command and control at Desert One, intelligence support, alternatives to the Desert One site, handling the dust phenomenon and C-130 pathfinders. The Holloway Commission went on to state that two

factors directly caused the mission abort: “unexpected helicopter failure rate and low-visibility flight conditions en route to Desert One.”<sup>113</sup>

## Conclusion

A military raid is amongst the most difficult of all missions to undertake. Gary Sick described a raid as “a high-risk venture that operates on the outer margins of the possible, relying on skill, daring and a good measure of luck. When a raid succeeds, it acquires almost magical qualities and endows its authors with the badge of genius. Hence the appeal. When it fails, it invites ridicule and the second-guessing of armchair strategists.”<sup>114</sup> Such has been the fate of Operation EAGLE CLAW in the years that have followed the tragedy at Desert One. The debacle has been credited as having influenced the creation of the *Goldwater Nichols Department of Defense Reorganization Act of 1986* that restructured the United States military in a manner more conducive to joint operations.<sup>115</sup> The lessons learned were further addressed in the *Cohen-Nunn Amendment* to the 1987 *National Defense Authorization Act*, which established the United States Special Operations Command.<sup>116</sup> Outside of those two Acts the discussion over Operation EAGLE CLAW has been on its failure. What has been lost in that discussion is the pioneering of modern aviation tactics that were born out of necessity during the five short months that the aircrew had to prepare for mission execution.<sup>117</sup>

When Captain Uttaro walked over to the 20<sup>th</sup> SOS, he had never seen NVGs before.<sup>118</sup> Six months later he had been promoted to Major and was executing NVG formation flying, blacked out EMCON aerial refueling and blacked out NVG landings and takeoffs in the middle of the Iranian Desert in a major real world operation. Upon Uttaro’s return to the United States he went to work ensuring that those lessons were captured in the MC-130 Tactical Manual.

Major Uttaro saw to it that those procedures were added and appeared in an updated version of the publication in 1981.<sup>119</sup>

Modern day Air Force C-130 pilots still consider blacked out NVG takeoffs and landings to unimproved surfaces “high risk” operations due to the prevalence of spatial disorientation and being very crew intensive.<sup>120</sup> Pilots now have the assistance of better avionics equipment, specifically Global Positioning System (GPS) that give them significant advantages compared to their predecessors. Despite this advantage, the current *MC-130 Air Force Tactics Techniques and Procedures* (AFTTP) manual dedicates twelve pages to describing the nuances of how to execute what is now referred to as a “self contained approach.”<sup>121</sup> Night EMCON Air to Air Refueling (AAR) while utilizing NVGs is now considered “routine”<sup>122</sup> for the modern MC-130 pilot and detailed information on the procedure can also be found in both the MC-130 AFTTP<sup>123</sup> and in a North Atlantic Treaty Organization (NATO) publication ATP-56(B), which serves as the master document for all joint and international AAR. The ATP-56(B) also outlines the procedures for what is now considered the routine conduct of EMCON AAR.<sup>124</sup> Formation flying also has a dedicated chapter in the MC-130 AFTTP but NVG formation flying is now so common that NVGs are only mentioned in regards to lighting considerations.<sup>125</sup>

Major Schaefer captured his own lessons learned in multiple publications as soon as he was released from the hospital. The basics of CH-53 NVG flight operations went into the Marine Corps CH-53 Tactical Manual published in 1982. More importantly, he ensured that the method they had developed for training CH-53 pilots to fly on NVGs was captured in the new Training and Readiness (T&R) Manual that would dictate the specific flight evolutions each pilot needed to complete. Major Schaefer chose to leave the technique he had developed for

flying a pattern to landing on NVGs in dusty conditions out of any publication, preferring that “ways to do things were passed by word of mouth.”<sup>126</sup>

Captain Brian Laurence, the CH-53 Division Head at MAWTS-1 recently stated that “NVG landings and external operations in brownout conditions remain the most dangerous evolutions that CH-53 crews do.”<sup>127</sup> The “word of mouth” technique that Major Schaefer had passed on twenty-seven years prior finally became an actual procedure when the “Desert Landing Approach Brief” made its first appearance in print with the publication of the *Naval Tactics Techniques and Procedures (NTTP) Tactical Pocket Guide CH-53 Helicopter* in November 2006.<sup>128</sup> The procedure continues to exist in the same manner that Schaefer developed with two minor improvements. The cockpit verbiage has been standardized and additional altitude and airspeed checkpoints on final approach have been included due to the GPS capability of providing ground speed that pilots can reference after the airspeed indicator becomes unreliable below forty knots. The December 2008 updated version added an even more detailed “Desert/ NVG Landing Pattern” procedure with even more detail between the basic checkpoints that Schaefer originally outlined in 1979 (See Appendix A, Figures 1-2).<sup>129</sup> Modern day CH-53 pilots are learning to execute dusty NVG landings in the same manner that the Operation EAGLE CLAW crews did at YPG over thirty years ago.

The NVG training syllabus that Major Schaefer incorporated into the original T&R Manual still exists and has expanded its focus to the use of NVGs for every CH-53 mission set. CH-53 pilots receive five orientation flights totaling nine hours in flight school before they ever even earn their wings.<sup>130</sup> After becoming aviators, CH-53 pilots now must complete eighty-two hours of night systems lectures, 208 hours of self paced readings,<sup>131</sup> and twenty-five NVG flights totaling thirty-nine hours just to be considered “Night Systems Qualified,” to carry passengers,

as a copilot.<sup>132</sup> In order to instruct other pilots to fly on NVGs, the most experienced Marine Corps CH-53 pilots must successfully complete an advanced Night Systems Instructor (NSI) syllabus that requires candidates to have a minimum of 100 NVG flight hours.<sup>133</sup> Captain Laurence points out that most aviators do not exhibit the requisite proficiency to enter the NSI syllabus until they have “closer to 200 hours of NVG flying experience.”<sup>134</sup>

The plan to fuel the helicopters directly from the C-130s and the layout of the refueling site at Desert One was a collaborative effort between all of the crews. As a result Majors Uttaro and Schaeffer ensured that those procedures were passed on to each of their respective services. The modern TTPs for the ground refueling of helicopters still resemble the site layout at Desert One.<sup>135</sup> The procedures exist today in multiple publications to include: the MC-130 AFTTP,<sup>136</sup> the Marine Corps *KC-130 Air Naval Tactics Techniques and Procedures* (ANTTP),<sup>137</sup> the Marine Corps *CH-53 Naval Tactics Techniques and Procedures* (NTP)<sup>138</sup> and the Marine Corps *Assault Support Tactical SOP* (ASTACSOP).<sup>139</sup> Several different layouts currently exist in those manuals, each individually tailored to different situations. The one constant is also the one difference between the modern day layouts and the one executed at Desert One. There is now a clear and distinguishable lane that the helicopters taxi through to take fuel that keeps them on a constant heading and clear of the C-130 providing the fuel (See Appendix B, Figures 3-9). The valuable lesson learned from Operation EAGLE CLAW remains in effect today.

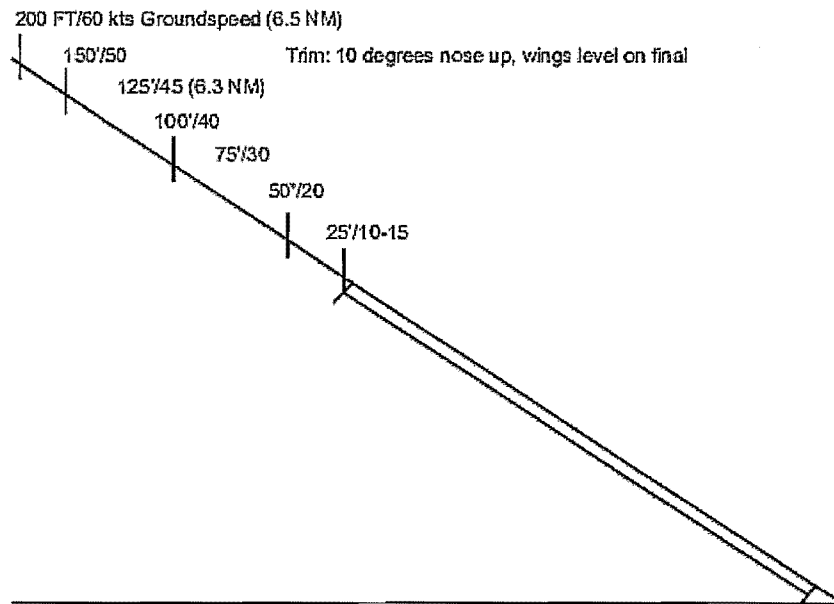
In examining today’s modern syllabi and extensive tactical doctrine it is clear the TTPs developed out of necessity for Operation EAGLE CLAW aircrews for NVG flying and Rapid Ground Refueling accelerated the advancement of aviation tactics and were the basis of the TTPs still in use today. Even with the dramatic increase in technology it takes years of detailed, focused and rigorous training to get modern day aircrew qualified to execute complex missions.

The crews that executed Operation EAGLE CLAW had five months to prepare to execute one of the most high profile and complex missions ever attempted, and they had to “start at ground zero.”<sup>140</sup> The lasting impact of their accelerated tactical development on modern day tactical aviation is beyond significant. To this day aircrews are employing the same tactics in real world operations that were developed in preparation for Operation EAGLE CLAW. The Holloway Commission made a point of stating that “the people who commanded, planned and executed the operation were the most competent and best qualified for the task of all available. There were none better.”<sup>141</sup> Of all that has been written and said about Operation EAGLE CLAW in the last thirty years that statement might be the most astute and the most important. Their contribution to aviation tactics is immeasurable.

## Appendix A

**Figure 1: CH-53 Desert Landing Approach Brief**

### DESERT LANDING APPROACH BRIEF



#### SITUATIONAL CALLS:

Lost or no reference is stated as "BROWNOUT."

CC: Starts making altitude calls at 25 feet and will continue to make them down to the deck. These calls negate the need for the CC to make "Reference" calls.

#### Once in the dust cloud:

PAC: "REFERENCE, \_\_\_\_\_ seat" or "Brownout \_\_\_\_\_ seat"

PNAC, in response will state "Reference, \_\_\_\_\_ seat" call.

PNAC shall state "Brownout, \_\_\_\_\_ seat" if no reference at ANY time.

If PAC loses reference and PNAC has reference, PAC passes controls to PNAC.

If PAC and PNAC both lose reference, a "Wave-OFF" call will be made initiating the wave-off.

Crew comfort will ultimately dictate when a wave-off should be made but at a minimum, the PAC and one Aircrewman must have reference to continue landing.

Pilot in right seat is referred to as "RIGHT SEAT."

Pilot in left seat is referred to as "LEFT SEAT."

Aircrewman in left window is referred to as "LEFT GUN."

Aircrewman in right window is referred to as "RIGHT GUN."

Aircrewman on ramp is referred to as "TAIL GUN."

#### Recommended Wave-Off Cues:

200' and below: >500fpm Rate of Descent

100' and below: >15-degree Nose Up

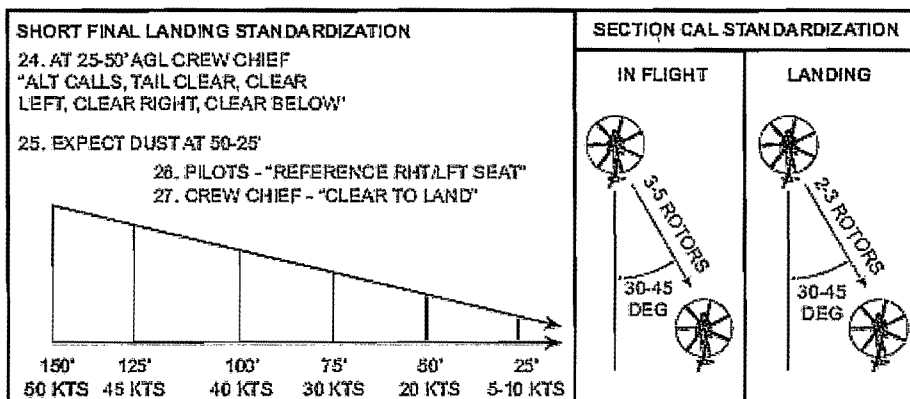
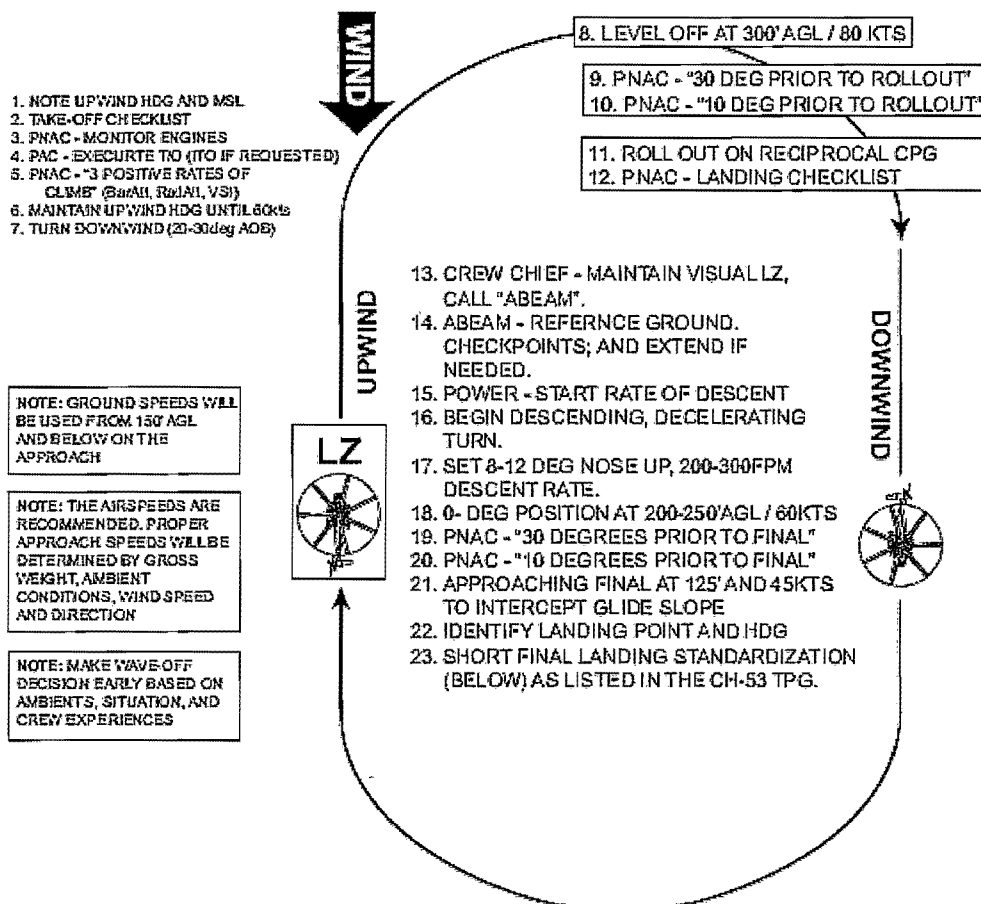
50' and below: >5 kts Fast

Source: MAWTS-1, *Tactical Pocket Guide CH-53 Helicopter*, Naval Tactics Techniques and Procedures NTTP 3-22.5-CH-53. (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, December, 2008), 74.



Figure 2: CH-53 Desert/NVG Landing Pattern

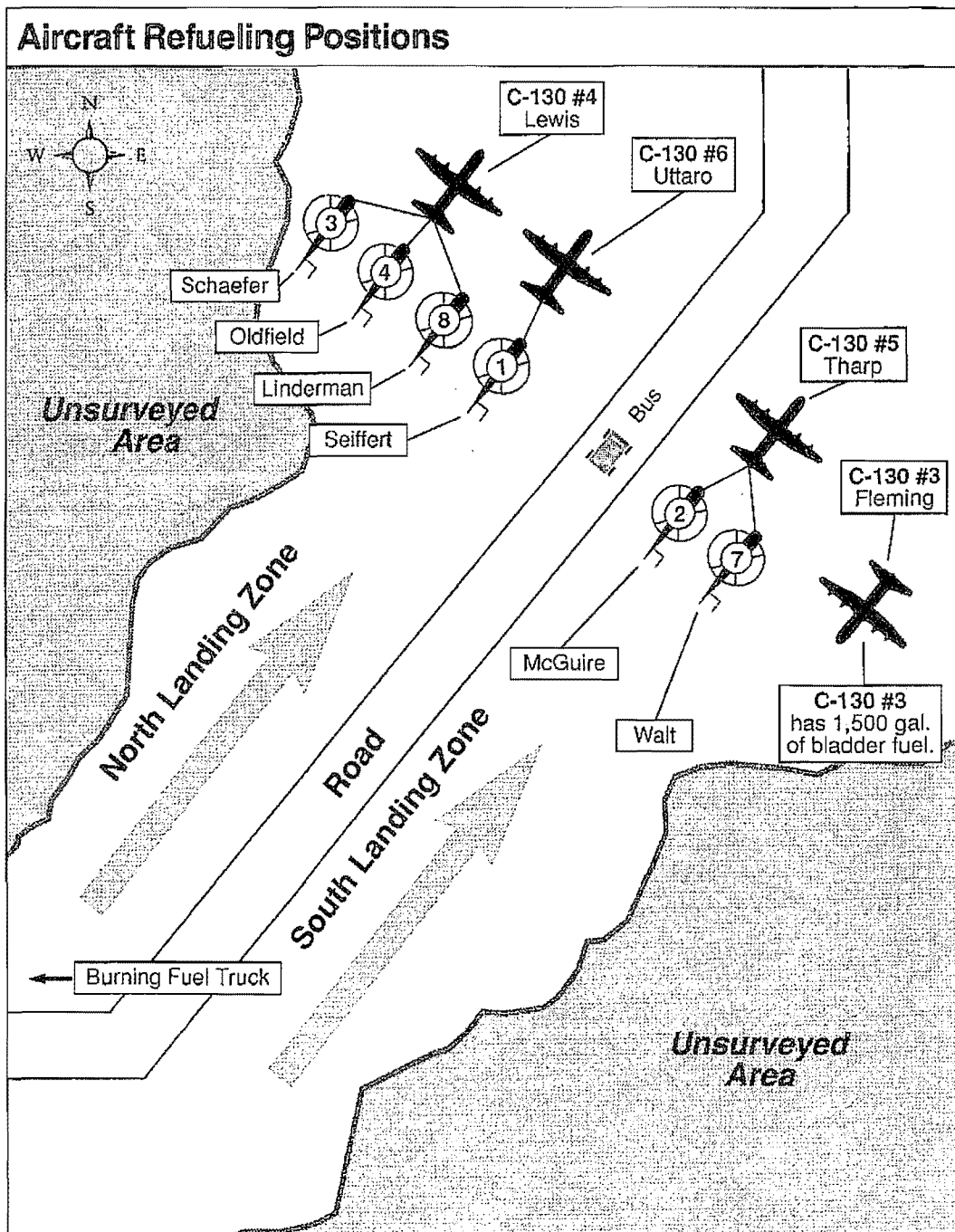
## DESERT/NVG LANDING PATTERN



Source: MAWTS-1, *Tactical Pocket Guide CH-53 Helicopter*, Naval Tactics Techniques and Procedures NTTP 3-22.5-CH-53. (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, December, 2008), 74.

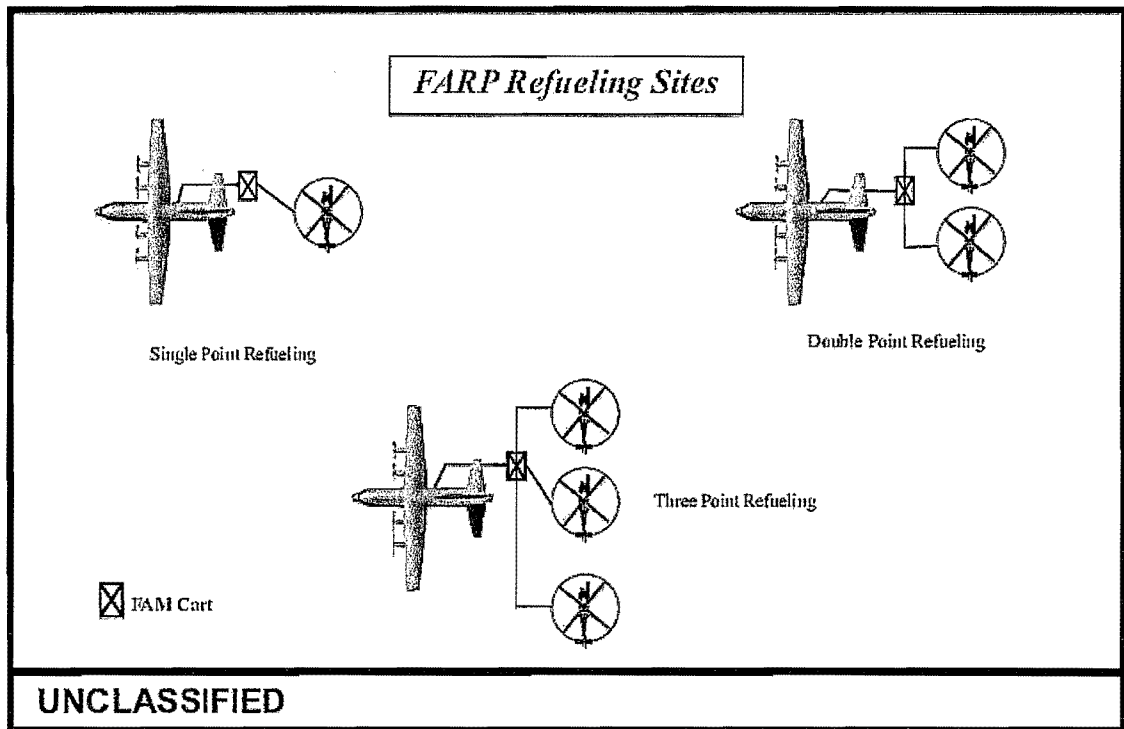
## Appendix B

Figure 3: Desert One Refuel Site



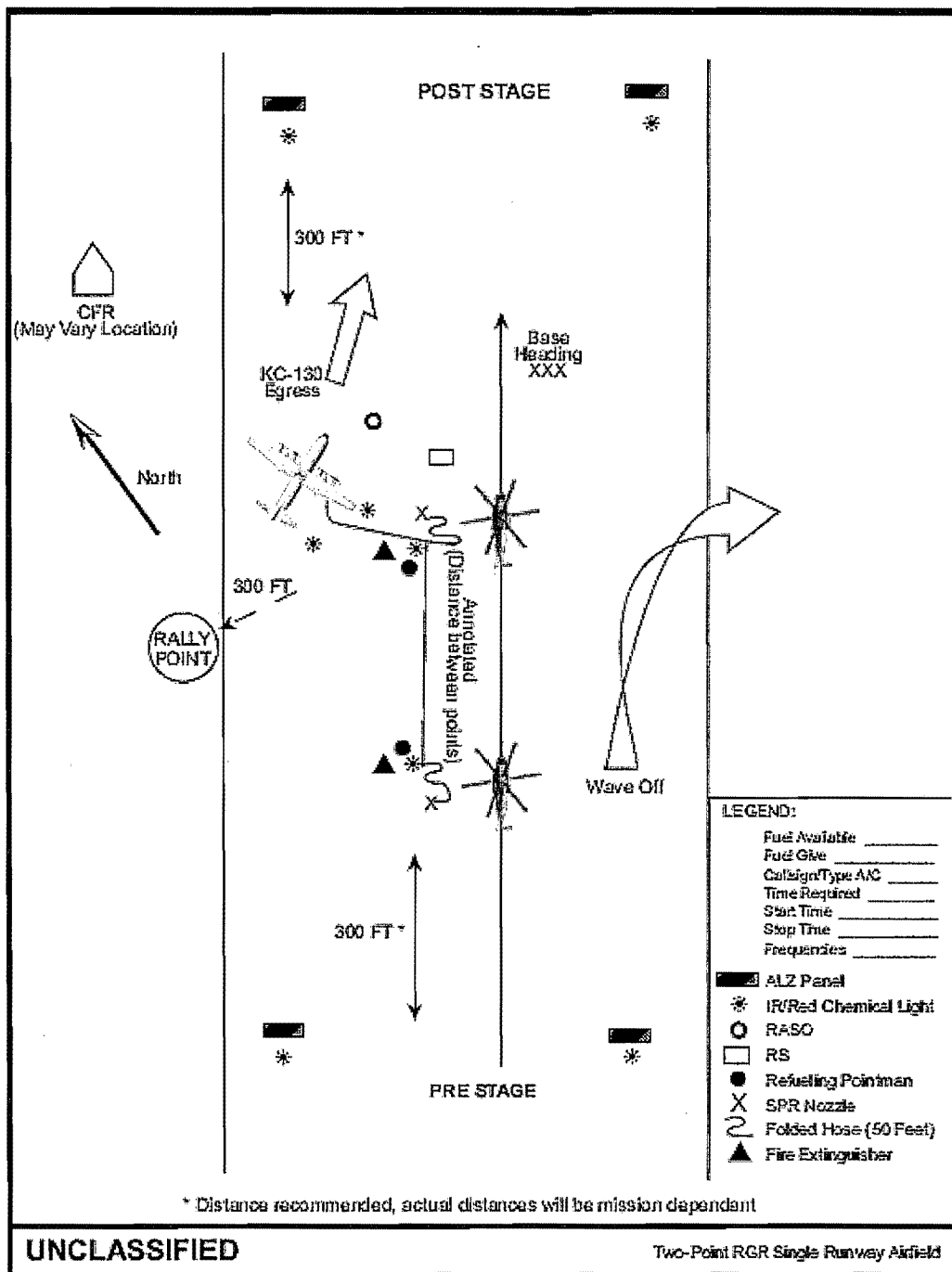
Source: James H. Kyle, and John Robert Edison. *The Guts to Try : The Untold Story of the Iran Hostage Rescue Mission by the On-Scene Desert Commander*. (1<sup>st</sup> ed. New York: Orion Books, 1990), 284

**Figure 4: USAF MC-130 FARP Refueling Site Layout**



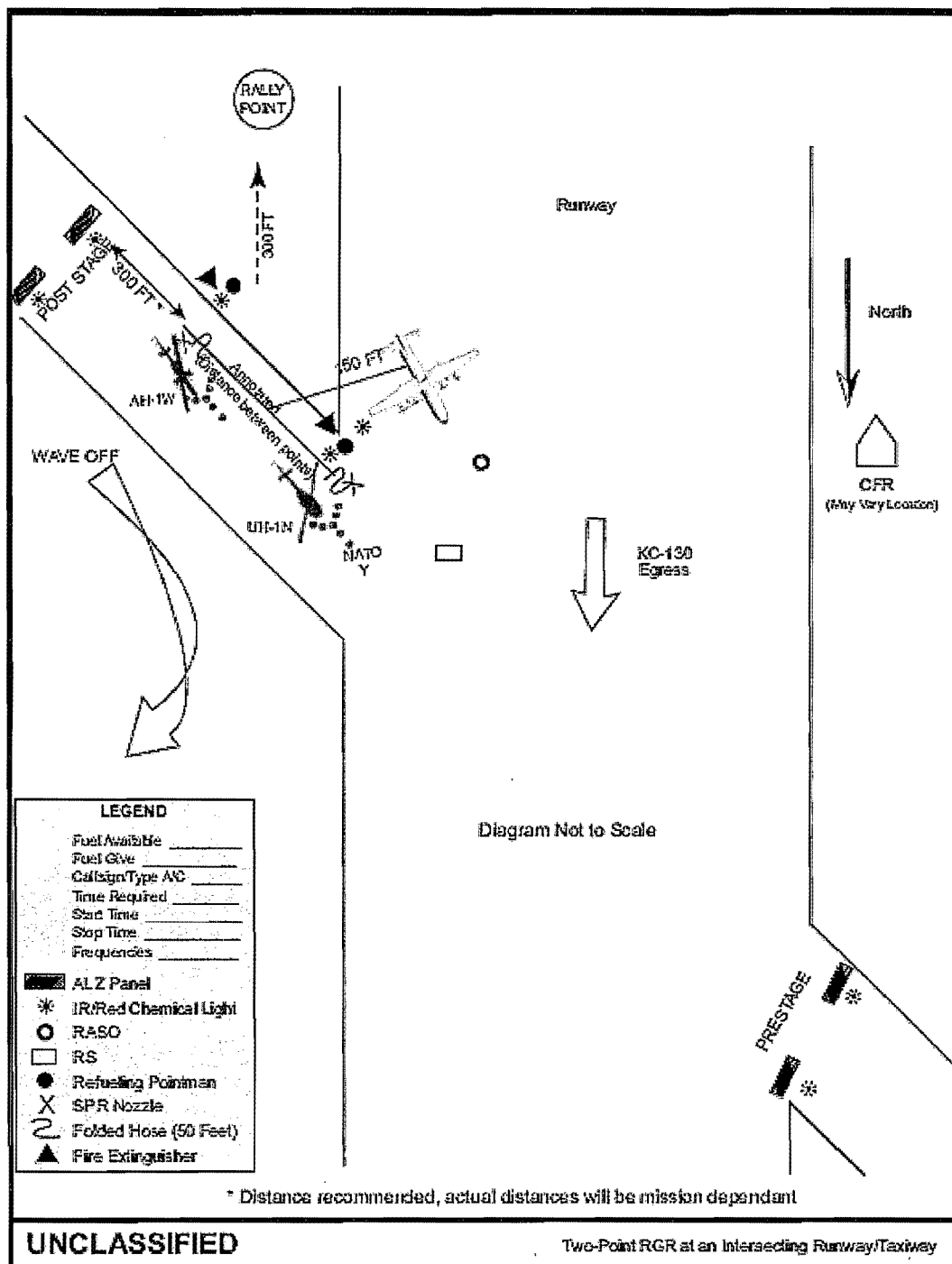
Source: AFSOC/A3, *Combat Aircraft Fundamentals HC/MC-130*, Air Force Tactics Techniques and Procedures AFTTP 3-3.HC/MC-130 (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, May 1, 2007), 2-37 Fig 2.11

**Figure 5: USMC KC-130 Two Point RGR Single Runway Airfield**



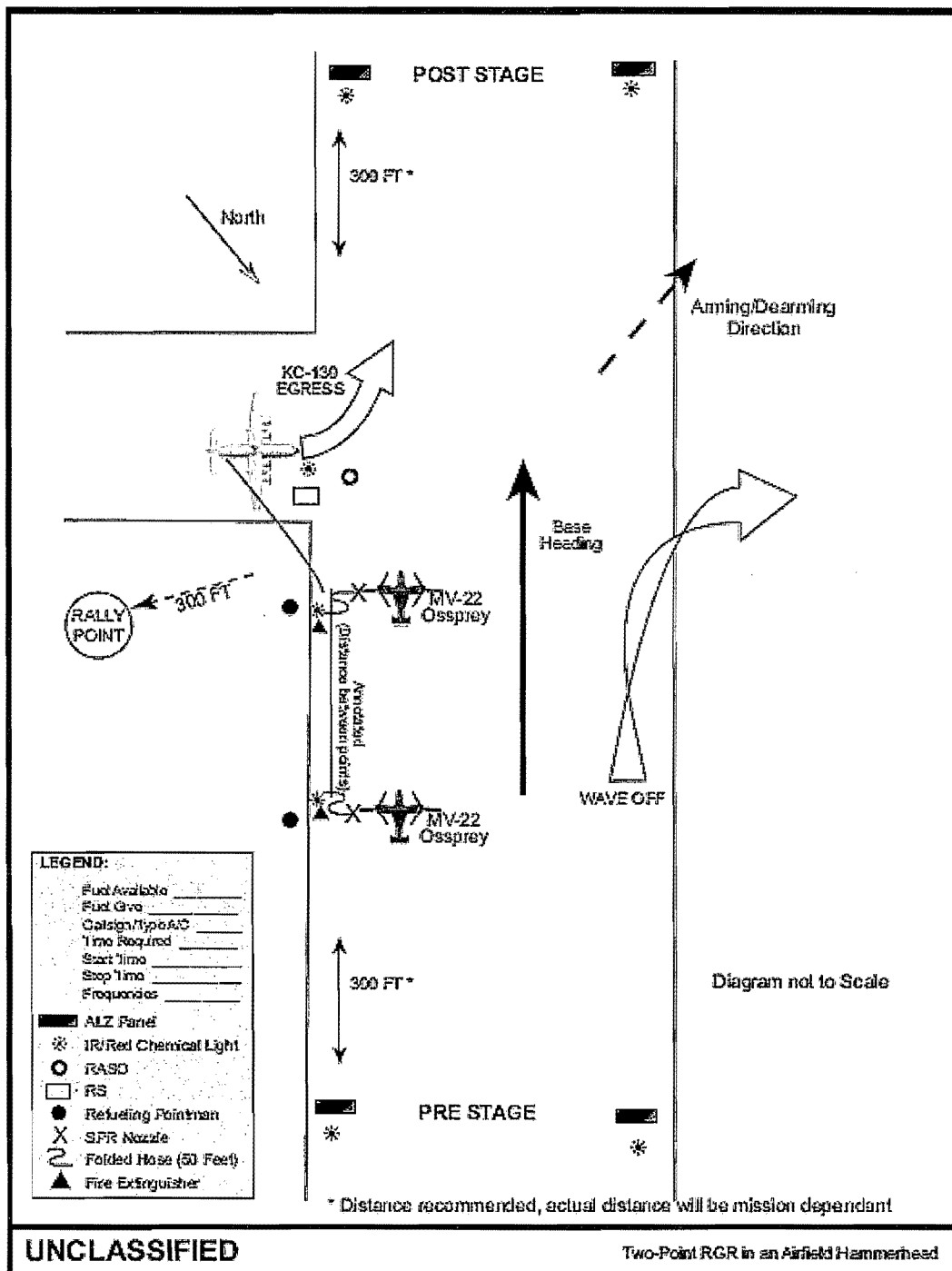
Source: MAWTS-1, *Combat Aircraft Fundamentals KC-130*, Air Naval Tactics Techniques and Procedures ANTTTP 3-22.3 KC-130 (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, September, 2008), 7-3 Fig 7.1

**Figure 6: USMC KC-130 Two Point RGR at an Intersecting Runway/ Taxiway.**



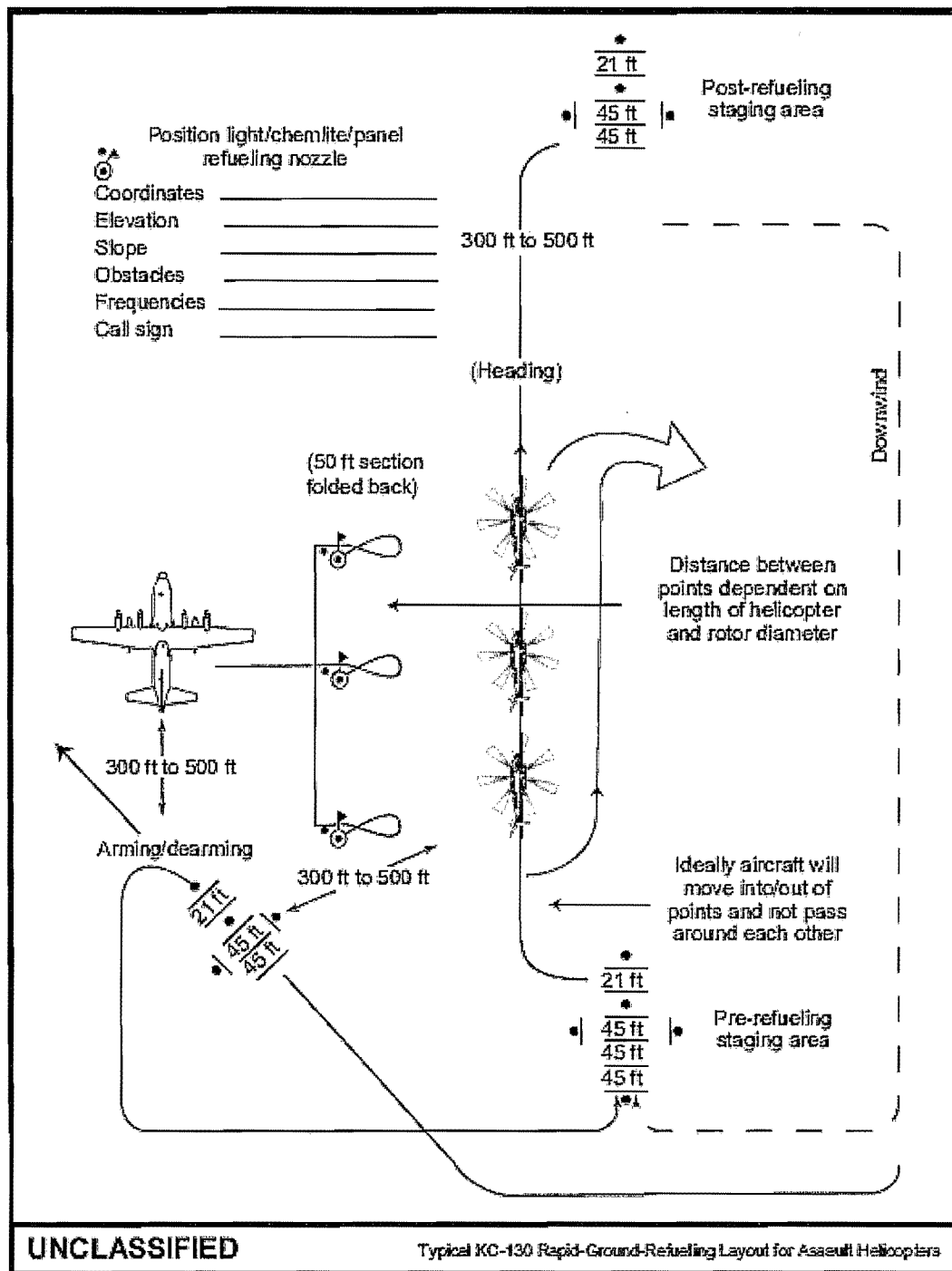
Source: MAWTS-1, *Combat Aircraft Fundamentals KC-130*, Air Naval Tactics Techniques and Procedures ANTPP 3-22.3 KC-130 (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, September, 2008), 7-4 Fig 7.2

**Figure 7: USMC KC-130 Two Point RGR in an Airfield Hammerhead.**



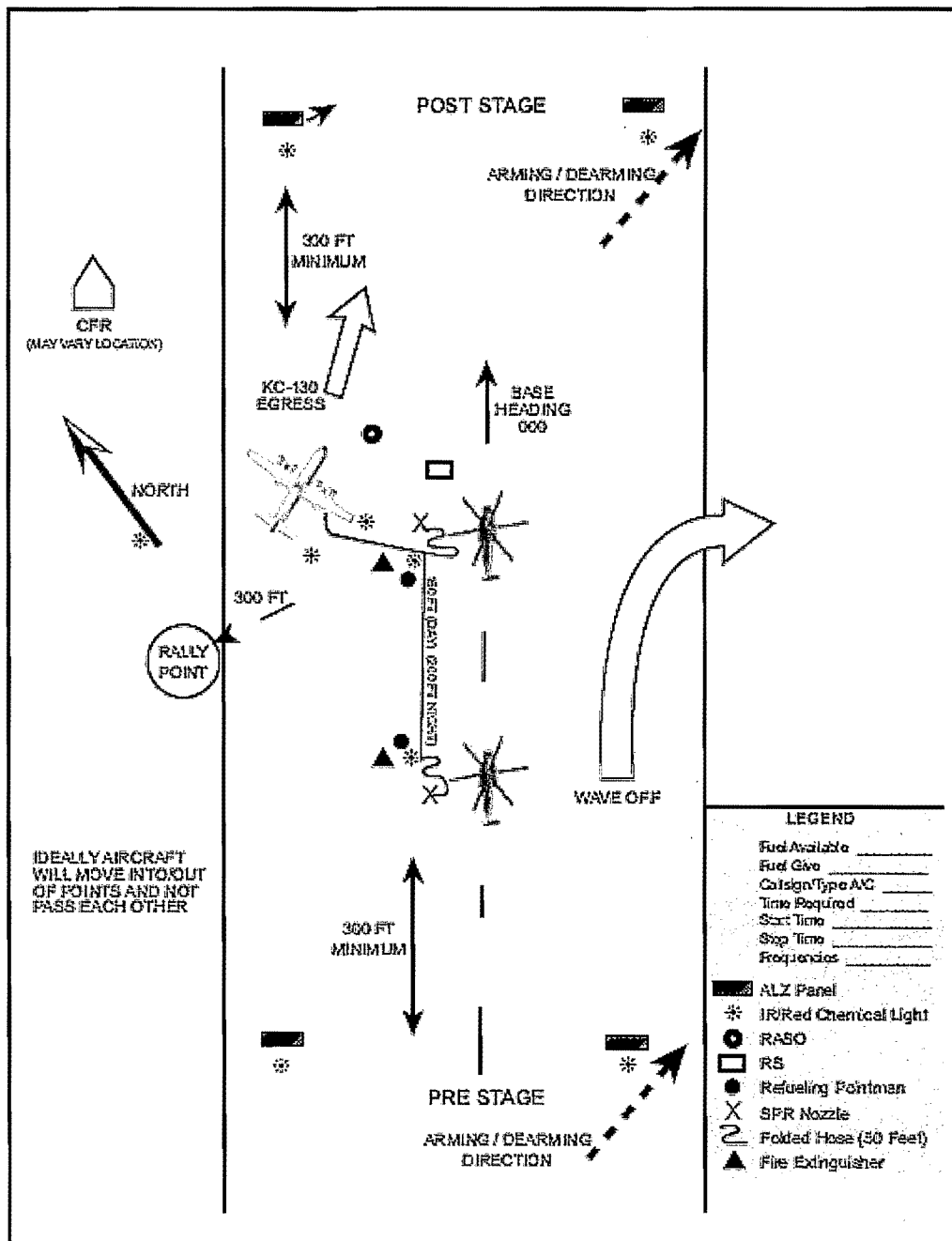
Source: MAWTS-1, *Combat Aircraft Fundamentals KC-130*, Air Naval Tactics Techniques and Procedures ANTTP 3-22.3 KC-130 (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, September, 2008), 7-5 Fig 7.3

**Figure 8: Typical KC-130 Rapid Ground Refueling Layout for Assault Helicopters.**



Source: MAWTS-1, *Combat Aircraft Fundamentals CH-53*, Naval Tactics Techniques and Procedures NTTP 3-22.3 CH-53(Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, November, 2008), 14-15 Fig 14.9

Figure 9: Two Point RGR with CH-53D/E



Source: MAWTS-1, *Tactical Pocket Guide USMC Assault Support Tactical SOP*, Air Naval Tactics Techniques and Procedures ANTP 3-22.5 ASTACSOP (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, September, 2008), 65



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## Notes

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- <sup>1</sup> Colonel James Schaefer USMC (Ret), telephone conversation with author, Dec 3, 2009.
- <sup>2</sup> Colonel James Schaefer USMC (Ret), conversation with author, Nov 3, 2009.
- <sup>3</sup> Schaefer, Dec 3, 2009.
- <sup>4</sup> Charles Tustin Kamps, "Operation EAGLE CLAW: The Iran Hostage Rescue Mission," *Air & Space Power Journal-Espanol*, (Fall 2006), 1.
- <sup>5</sup> Rapid Ground Refueling is the modern Marine Corps term for the refueling of helicopters on the ground by KC-130. The Air Force simply refers to the procedure as a FARP. At the time of Operation EAGLE CLAW there was no set term for the procedure.
- <sup>6</sup> Daniel P. Bolger. *Americans at War, 1975-1986: An Era of Violent Peace*. (Novato, CA: Presidio, 1988), 100.
- <sup>7</sup> Bolger, 102.
- <sup>8</sup> Gary Sick. *All Fall Down: America's Tragic Encounter With Iran*. (1<sup>st</sup> ed. New York: Random House 1985), 175.
- <sup>9</sup> Bolger, 103.
- <sup>10</sup> David Patrick Houghton. *US Foreign Policy and the Iran Hostage Crisis*. Cambridge studies in international relations. Vol.75. Cambridge; (New York: Cambridge University Press, 2001), 75-80.
- <sup>11</sup> Houghton, 110.
- <sup>12</sup> Sick, 217-218.
- <sup>13</sup> Bolger, 103. Thirteen hostages that were either African American or Female were released within two weeks of the initial seizure of the embassy.
- <sup>14</sup> Sick, 195.
- <sup>15</sup> United States. Joint Chiefs of Staff. Special Operations Review Group. *Rescue Mission Report*. Vol. E 183.8 I55 U535 (Washington, D.C.: Joint Chiefs of Staff 1980), iv.
- <sup>16</sup> Wade Ishimoto. "Rice Bowl/ EAGLE CLAW." (Lecture, Marine Corps Command and Staff College, Quantico, VA, Nov 3, 2009).
- <sup>17</sup> Ishimoto.
- <sup>18</sup> James H. Kyle, and John Robert Edison. *The Guts to Try: The Untold Story of the Iran Hostage Rescue Mission by the On-Scene Desert Commander*. (1<sup>st</sup> ed. New York: Orion Books, 1990), 47-48.
- <sup>19</sup> Ishimoto
- <sup>20</sup> Ishimoto.
- <sup>21</sup> Kyle, 48.
- <sup>22</sup> Kyle, 73-74.
- <sup>23</sup> Kyle, 73-74.
- <sup>24</sup> Kyle, 71.
- <sup>25</sup> Kyle, 59.
- <sup>26</sup> Schaefer, Dec 3, 2009.
- <sup>27</sup> Schaefer, Nov 3, 2009.
- <sup>28</sup> Schaefer, Dec 3, 2009.
- <sup>29</sup> Kyle, 75.
- <sup>30</sup> Colonel Jerry Uttaro USAF (Ret), telephone conversation with author, Dec 7, 2009.
- <sup>31</sup> Colonel Jerry Uttaro USAF (Ret), telephone conversation with author, Jan 11, 2010.

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- <sup>32</sup> Kyle, 80.
- <sup>33</sup> United States. Joint Chiefs of Staff, 5.
- <sup>34</sup> Uttaro, Dec 7, 2009.
- <sup>35</sup> Uttaro, Dec 7, 2009.
- <sup>36</sup> Uttaro, Dec 7, 2009.
- <sup>37</sup> Uttaro, Dec 7, 2009.
- <sup>38</sup> Colonel James Kyle USAF (Ret), email from author, Dec 21, 2009.
- <sup>39</sup> Uttaro, Dec 7, 2009.
- <sup>40</sup> Uttaro, Jan 11, 2010.
- <sup>41</sup> Kyle, 81.
- <sup>42</sup> Schaefer, Dec 3, 2009.
- <sup>43</sup> Schaefer, Dec 3, 2009.
- <sup>44</sup> Schaefer, Dec 3, 2009.
- <sup>45</sup> Schaefer, Dec 3, 2009.
- <sup>46</sup> Schaefer, Dec 3, 2009.
- <sup>47</sup> United States. Joint Chiefs of Staff, 5.
- <sup>48</sup> Kyle, 92.
- <sup>49</sup> Kyle, 81.
- <sup>50</sup> Schaefer, Nov 3, 2009.
- <sup>51</sup> Kyle, 82-83.
- <sup>52</sup> Kyle, 93-95.
- <sup>53</sup> Schaefer, Nov 3, 2009.
- <sup>54</sup> Kyle, 97.
- <sup>55</sup> Kyle, 106.
- <sup>56</sup> Kyle, 106.
- <sup>57</sup> Schaefer, Nov 3, 2009.
- <sup>58</sup> Colonel Edward Seiffert USMC (Ret), conversation with author, Feb 24, 2010.
- <sup>59</sup> Kyle, 101.
- <sup>60</sup> Kyle, 49.
- <sup>61</sup> Uttaro, Dec 7, 2009.
- <sup>62</sup> Schaefer, Dec 3, 2009.
- <sup>63</sup> Uttaro, Dec 7, 2009.
- <sup>64</sup> Uttaro, Dec 7, 2009.
- <sup>65</sup> Kyle, 115.
- <sup>66</sup> Schaefer, Dec 3, 2009.
- <sup>67</sup> Schaefer, Dec 3, 2009.
- <sup>68</sup> Schaefer, Dec 3, 2009. Emission control is the selective and controlled use of electromagnetic, acoustic or other emitters to minimize detection by enemy sensors for operations security.
- <sup>69</sup> Uttaro, Dec 7, 2009.
- <sup>70</sup> Kyle, 115.
- <sup>71</sup> Uttaro, Dec 7, 2009.
- <sup>72</sup> United States. Joint Chiefs of Staff, 6.
- <sup>73</sup> Ishimoto.

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<sup>74</sup> *The Hutchinson Unabridged Encyclopedia with Atlas and Weather guide*. Abington: Helicon, 2009. s.v. "Omega navigation system."

[http://www.credoreference.com/entry/heliconhe/omega\\_navigation\\_system](http://www.credoreference.com/entry/heliconhe/omega_navigation_system) (accessed March 16, 2010). The Omega navigation system was a long-range radio-based aid to navigation with world wide coverage. It was discontinued in September 1997 with the advent of the Global Positioning System (GPS).

<sup>75</sup> United States. Joint Chiefs of Staff, 6.

<sup>76</sup> Ishimoto.

<sup>77</sup> United States. Joint Chiefs of Staff, 6.

<sup>78</sup> Kyle, 120.

<sup>79</sup> Colonel Edward Seiffert USMC (Ret), telephone conversation with author, Mar 16, 2010. In the Continental United States Visual Meteorological Conditions are defined by specific cloud clearance distances and visibility in terms of statute miles for the varying classes of airspace. No such specific parameters were ever defined for Operation EAGLE CLAW.

<sup>80</sup> United States. Joint Chiefs of Staff, 6.

<sup>81</sup> Kyle, 120.

<sup>82</sup> United States. Joint Chiefs of Staff, 6.

<sup>83</sup> United States. Joint Chiefs of Staff, 7.

<sup>84</sup> United States. Joint Chiefs of Staff, 7.

<sup>85</sup> Uttaro, Dec 7, 2009.

<sup>86</sup> Schaefer, Nov 3, 2009.

<sup>87</sup> United States. Joint Chiefs of Staff, 7.

<sup>88</sup> United States. Joint Chiefs of Staff, 8.

<sup>89</sup> Kyle, 161.

<sup>90</sup> Seiffert, Feb 24, 2010.

<sup>91</sup> Kyle, 161.

<sup>92</sup> Kyle, 155.

<sup>93</sup> Kyle, 131.

<sup>94</sup> Kyle, 168-169.

<sup>95</sup> United States. Joint Chiefs of Staff, 8.

<sup>96</sup> Bolger, 103.

<sup>97</sup> United States. Joint Chiefs of Staff, 8.

<sup>98</sup> Kyle, 178-181.

<sup>99</sup> Kyle, 181-185.

<sup>100</sup> Schaefer, Nov 3, 2009.

<sup>101</sup> United States. Joint Chiefs of Staff, 9.

<sup>102</sup> Seiffert, Mar 16, 2010. In the Continental United States Instrument Meteorological Conditions are defined by specific cloud clearance distances and visibility in terms of statute miles for the varying classes of airspace. No such specific parameters were ever defined for Operation EAGLE CLAW.

<sup>102</sup> United States. Joint Chiefs of Staff, 6.

<sup>103</sup> Schaefer, Nov 3, 2009.

<sup>104</sup> United States. Joint Chiefs of Staff, 9.

<sup>105</sup> Ishimoto.

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- <sup>106</sup> Schaefer, Nov 3, 2009.
- <sup>107</sup> United States. Joint Chiefs of Staff, 9.
- <sup>108</sup> Kyle, 291.
- <sup>109</sup> Schaefer, Nov 3, 2009.
- <sup>110</sup> Kyle, 295.
- <sup>111</sup> United States. Joint Chiefs of Staff, 10.
- <sup>112</sup> United States. Joint Chiefs of Staff, 1.
- <sup>113</sup> United States. Joint Chiefs of Staff, 3.
- <sup>114</sup> Sick, 299.
- <sup>115</sup> James R. Locher III, "Has it Worked?" The Goldwater-Nichols Reorganization Act," *Naval War College Review*, (Autumn 2001, Vol LIV, No.4), 6-12.
- <sup>116</sup> Kamps, 6.
- <sup>117</sup> Isaac Lee, "Operation EAGLE CLAW: "The Catalyst for Change," (manuscript, Marine Corps University, 2009), 11.
- <sup>118</sup> Uttaro, Jan 11, 2010.
- <sup>119</sup> Uttaro, Dec 7, 2009.
- <sup>120</sup> Major Shawn Dawley USAF, C-130H3 pilot, conversation with author Jan 15, 2010.
- <sup>121</sup> AFSOC/A3, *Combat Aircraft Fundamentals HC/MC-130*, Air Force Tactics Techniques and Procedures AFTTP 3-3. HC/MC-130, (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, May 1, 2007), 7-14 thru 7-26.
- <sup>122</sup> Dawley, Jan 15, 2010.
- <sup>123</sup> AFSOC/A3, AFTTP 3-3. HC/MC-130, Ch.6.
- <sup>124</sup> NATO, *Air to Air Refueling*, Allied Tactical Publication ATP-56(B) (NATO Standardization Agency, December 14, 2008), Part 3 5A-1.
- <sup>125</sup> AFSOC/A3, AFTTP 3-3. HC/MC-130, 5-11.
- <sup>126</sup> Schaefer, Dec 3, 2009.
- <sup>127</sup> Captain Brian Laurence USMC, MAWTS-1 CH-53 Division Head, conversation with author, January 14, 2010
- <sup>128</sup> MAWTS-1, *Tactical Pocket Guide CH-53 Helicopter*, Naval Tactics Techniques and Procedures NTTP 3-22.5-CH-53 (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, November, 2006), 63.
- <sup>129</sup> MAWTS-1, *Tactical Pocket Guide CH-53 Helicopter*, Naval Tactics Techniques and Procedures NTTP 3-22.5-CH-53 (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, November, 2006), 73.
- <sup>130</sup> Lieutenant Michael St. Jean USN, HT-18 Standardization, telephone conversation with author, January 15, 2010.
- <sup>131</sup> MAWTS-1, *CH-53 Course Catalog*, (MCAS Yuma, AZ: MAWTS-1, August 20, 2007), 1-2.
- <sup>132</sup> Marine Corps Combat Development Command, *CH-53 Pilot Training and Readiness Manual*, NAVMC 3500.47 CH-53 (Washington D.C.: Headquarters United States Marine Corps, June 18,2008), Encl 1.
- <sup>133</sup> MAWTS-1, *CH-53 Course Catalog*, 4-3.
- <sup>134</sup> Laurence, Jan 14, 2010.
- <sup>135</sup> Lee, 11.
- <sup>136</sup> AFSOC/A3, AFTTP 3-3. HC/MC-130, 3-13 thru 3-23.

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<sup>137</sup> MAWTS-1, *Combat Aircraft Fundamentals KC-130*, Air Naval Tactics Techniques and Procedures ANTTP 3-22.3 KC-130 (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, September, 2008), Ch.7 all

<sup>138</sup> MAWTS-1, (U) *Combat Aircraft Fundamentals CH-53*, Naval Tactics Techniques and Procedures NTTP 3-22.3-CH53 (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, November, 2008), 14-14.

<sup>139</sup> MAWTS-1, *Tactical Pocket Guide USMC Assault Support Tactical SOP*, Air Naval Tactics Techniques and Procedures ANTTP 3-22.5-ASTACSOP (Nellis, AFB: 561<sup>st</sup> Joint Tactics Squadron, September, 2008), 65.

<sup>140</sup> Schaefer, Nov 3, 2009.

<sup>141</sup> United States. Joint Chiefs of Staff, 3.